Panel Meters

FEMA ELECTRÓNICA

Series TAS

Panel meters 96x48 mm

Model TAS-Vac	for voltages AC
Model TAS-Vdc	for voltages DC
Model TAS-Iac	for currents AC
Model TAS-Idc	for currents DC

Panel meter for electrical signals in voltages or currents, both in AC or DC. Instrument with 96x48mm housing and standard 14mm digit height, includes excitation voltage for transducers. Power options in AC and DC, signal retransmission and control options.

USER'S MANUAL
(1321R02)

Models VAC, VDC, IAC and IDC

Panel meters 96x48mm size for electrical signals in voltages and currents AC or DC

Panel meter for electrical signals in current or voltage, both in AC and DC, with multiple input ranges selectable.

Size 96x48mm DIN standard instrument, with standard 14mm digit height, and 4 1/2 digit resolution (maximum 32000) and negative sign. Connections via plug-in screw terminals and configuration via front push-buttons. For application on industrial environments.

Power options in AC and DC and additional control and/or retransmission modules. The instrument can manage up to 4 alarms.

Order Reference

	Model	Power	Option1	Option2	Option 3
TAS -	**VDC** -	**0** -	**---** -	**---** -	**---**
	-VDC	-0 *230 Vac*	-EXP	-TSAT	-TEK
	-VAC	-1 *115 Vac*	-AL2	-R485M	
	-IDC	-6 *24 Vdc*	-AL4	-TEK	
	-IAC				

Read first

* When the instrument is powered, a message displays the configured signal (see section 2 or section 4)

* If while in operation, the instrument shows a message on display see section 4.11 «Messages and Errors»

* The frontal keypad of the instrument has two functions, «numerical» and «direct access» function :

Key AL - Access to the alarm setpoint
Key HI - High display value (High)
Key LO - Low display value (Low)
Key ADJ - Field correction
Key DP - Decimal Point position
PROG - introduce programming codes (4 digit codes, see section 4)

* MESSAGE «TIME».- The current programing procedure has been stopped because there has been no interaction from the user for the last 5 seconds

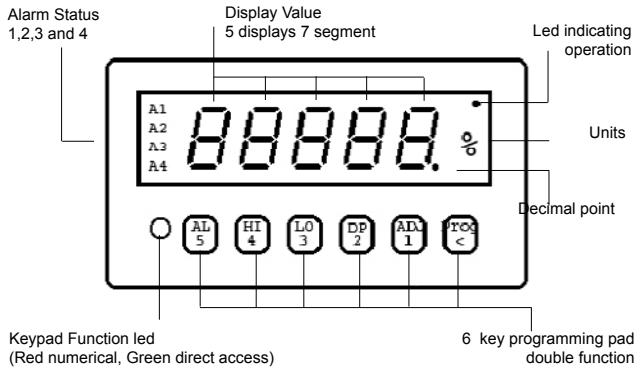
* SIGNAL RANGES.- To work with a signal range which is not directly shown in this manual, select the closest upper range and change the calibration parameters with code [14 11].

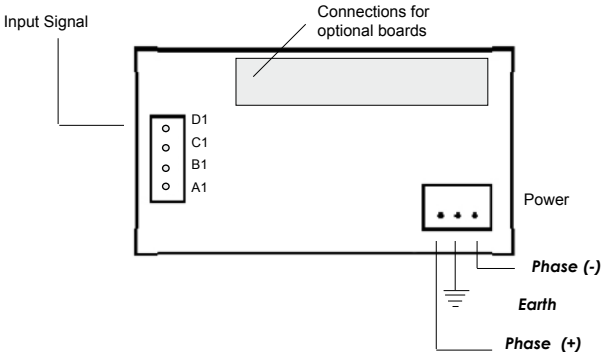
* Example .- to configure a 0/5 Vdc signal from a 0/10 BAR transducer :

1.- select the 0/10 Vdc range
2.- enter code [14 11]
3.- edit 0 Vdc = 0 and 5 Vdc =10,000

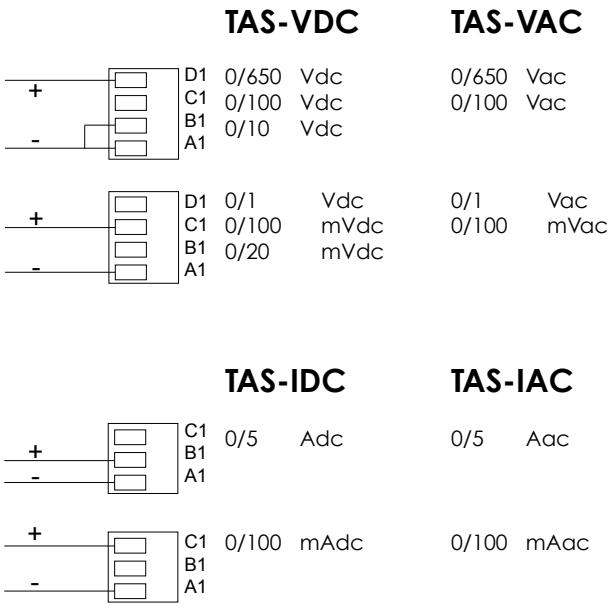
* If afterwards the value of 10.000 needs to be changed, it can be directly accessed and changed with key «HI».

0 Front view

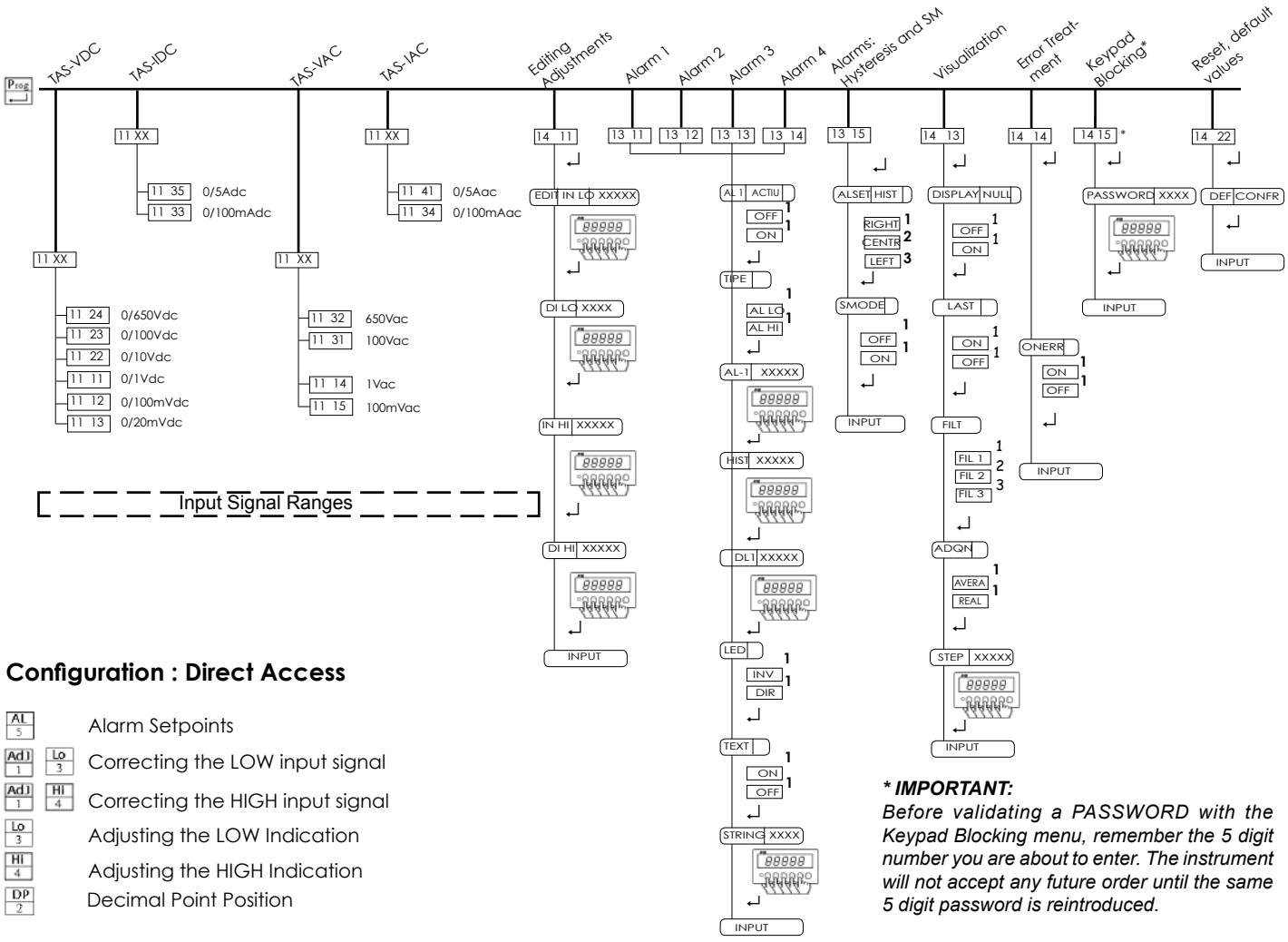




1 Signal connections



2 Programming menu



Configuration : Direct Access

- AL 5 — Alarm Setpoints
- Adj 1 / Lo 3 — Correcting the LOW input signal
- Adj 1 / HI 4 — Correcting the HIGH input signal
- Lo 3 — Adjusting the LOW Indication
- HI 4 — Adjusting the HIGH Indication
- DP 2 — Decimal Point Position

**** IMPORTANT:***

Before validating a PASSWORD with the Keypad Blocking menu, remember the 5 digit number you are about to enter. The instrument will not accept any future order until the same 5 digit password is reintroduced.

3 Direct access configuration

See section 3.1 to introduce an input signal range code. Codes are shown in section 2. Examples in section 3.2 show how to set-up a unit using direct-access keys to configure a 0/5 Aac input signal range with a 0/2500.0 reading, using also the signal correction functions «ADJ HI» and «ADJ LO».

The input / reading data can also be set-up with configuration menu [14 11]. The current example is for a TAS-AC unit.

3.1- INPUT SIGNAL

The TAS units have several built-in predefined input signal ranges, selectable with the help of codes (4 digit codes). On page 4 there is a list of all accessible ranges and the codes associated.

3.2- DIRECT ACCESS

The frontal keypad has several direct access buttons for a quick configuration of the instrument :

Pad 1 (ADJ) - Correct the LOW or HIGH input levels
Pad 2 (DP) - Decimal Point Position
Pad 3 (LO) - Set for the LOW indication level
Pad 4 (HI) - Set for the HIGH indication level
Pad 5 (AL) - Alarms Setpoint

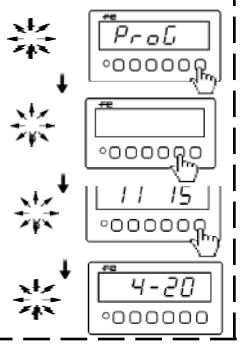
CONFIGURING A 0/5 AAC *INPUT SIGNAL RANGE (Code 11 41 ; as shown on table on page 4, for a TAS-IAC unit)*

1- Press **Prog**
message «Prog» during 1 second blank screen

2- Input the code **11 41**

3- Validate the code pressing ↵

4- Message showing the selected range «5 A» during 1 second



3.2.1- DECIMAL POINT POSITION

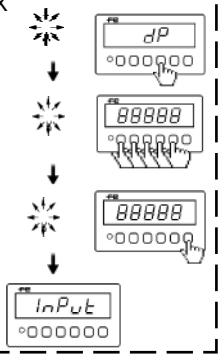
Activate the Decimal Point at position XXX.XX

1- Press **DP**

2- message «DP» during 1 second
Press 2 to fix decimal point position **3**
(To fix at other positions, press 1,2,3,4 or 5)

3- Validate changes pressing ↵

message «INPUT» shows the configuration has been accepted



3.2.2- ADJUSTING THE LOW INDICATION VALUE

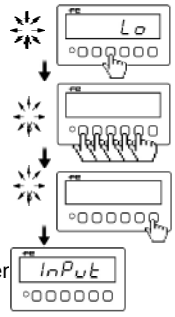
For the low input level (0 Aac) we want to configure a low indication of 0000.0

1- Press **Lo**

2- Current value for the low indication is displayed.
Modify it by pressing on **1,2,3,4,5**
until we see 00000

3- Validate the changes pressing ↵

message «INPUT» shows the configuration has been accepted



3.2.3- ADJUSTING THE HIGH INDICATION VALUE

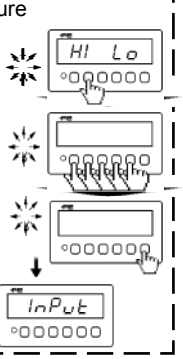
For the high input level (5 Aac) we want to configure a high indication of 2500.0

1- Press **Hi**

2- Current value for the high indication is displayed.
Modify it by pressing on **1,2,3,4,5**
until we see 25000

3- Validate the changes pressing ↵

message «INPUT» shows the configuration has been accepted



3.2.4- ALARM SETPOINTS

Fix the setpoint for Alarm1 at 10500

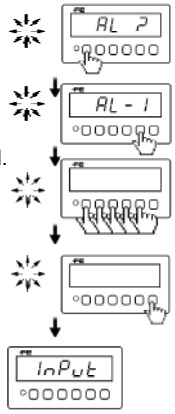
1- Press **AL**

2- Enter the number of the alarm we want to modify **1**

3- Current value for Alarm1 setpoint is displayed.
Modify it by pressing on **1,2,3,4,5**
until we see 10500

4- Validate the changes pressing ↵

message «INPUT» shows the configuration has been accepted



3.2.5- CORRECTING THE LOW INPUT SIGNAL (OFFSET)

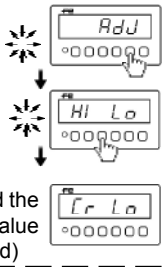
Allows offset correction, by linking the current input signal on terminals to the Low Indication Value memorized.

1- Generate the low input level signal

2- Press Adjust **Adj**
The instrument asks «Hi» or «Lo» ?

3- Press **Lo**

4- Message «Cr Lo» shows the unit has corrected the low level value, linking the current input signal value to the low indication value memorized (LO keypad)



3.2.6- CORRECTING THE HIGH INPUT SIGNAL

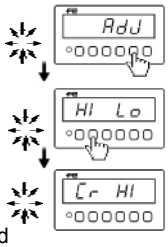
Allows to link a current signal at the input terminals to the High Indication Value memorized on the HI keypad.

1- Generate the high input level signal

2- Press Adjust **Adj**
The instrument asks «Hi» or «Lo» ?

3- Press **Hi**

4- Message «Cr Hi» shows the unit has corrected the high level value, linking the current input signal to the high indication value memorized (HI keypad)



4 Codes configuration

4.1- INPUT SIGNAL : DC VOLTAGE

Codes : 11 XX

Input	Code		Message
0/650 Vdc	11	24	650U
0/100 Vdc	11	23	100U
0/10 Vdc	11	22	10U
0/1 Vdc	11	11	1U
0/100 mVdc	11	12	100mU
0/20 mVdc	11	13	20mU

4.2- INPUT SIGNAL : AC VOLTAGE

Codes : 11 XX

Input	Code		Message
0/650 Vac	11	32	650AU
0/100 Vac	11	33	100AU
0/1 Vac	11	14	1AU
0/100 mVac	11	15	100mAU

4.3- INPUT SIGNAL : DC CURRENT

Codes : 11 XX

Input	Code		Message
0/5 Adc	11	35	5Ab
0/100 mAdc	11	33	100mAb

4.4- INPUT SIGNAL : AC CURRENT

Codes : 11 XX

Input	Code		Message
0/5 Aac	11	41	5AA
0/100 mAac	11	34	100mAA

4.5- ALARM CONFIGURATION

Alarm Number	Code		Menu
Alarm 1	13	11	Alarm Parameters
Alarm 2	13	12	Alarm Parameters
Alarm 3	13	13	Alarm Parameters
Alarm 4	13	14	Alarm Parameters
General	13	15	Hysteresis and SM

The alarm configuration menu list several parameters to which we must assign a value.

Numerical values are assigned with the number pads. Predefined values (such as ON/OFF) are selected by selecting available options with keys '**1**', '**2**' or '**3**'.

Validate with key '↵' in order to access next parameter.

Menu : Alarm Parameters

Parameters	Values	Description
AL1	On oFF	Alarm1 working Alarm1 not working
tIPE	AL Hi AL Lo	Alarm1 working as «maximum» Alarm1 working as «minimum»
AL-1	88888	Setpoint for Alarm1 (expressed in display points)
HISt	88888	Hysteresis value (max. 255) (expressed in display points)
dL1	88888	Delay on relay activation (expressed in seconds)
LEd	dir inU	Led is active when alarm is active Led is active when alarm is inactive
tErt	On oFF	Alarm text active Alarm text inactive
StrnG	88888	Text associated with alarm led

Menu : Hysteresis and SM

Parameters configured on this menu apply to the 4 alarms

Parameters	Values	Function
HISt	LEFt	Hysteresis is applied to the process of alarm deactivation*
	CEntr	Band alarm. Hysteresis is applied to the process of alarm activation and deactivation*
	rIGHt	Hysteresis is applied to the process of alarm activation.* *The hysteresis points are defined on parameter HYST for each alarm.
SModE	On	Security Mode activated on alarms acting as «minimum»**
	oFF	Security Mode deactivated **Output relay are inactive until the set point is reached for the first time.

4.6- MANUAL ADJUSTMENT

Code : 14 11 Function : Ed it

Parameters	Values	Function
In Lo	number	*Input Low* - Low Input Signal
d1 Lo	number	*Display Low* - Indication for Low Signal
In HI	number	*Input High* - High Input signal
d1 HI	number	*Display High*- Indication for High Signal

Code 14 11 can be used both to modify adjustments and to visualize current values.

4.7- DEALING WITH ERRORS

Code : 14 14 Function : onErr

Parameters	Values	Function
onErr	on	Activates all alarms in case of error state *
	oFF	Deactivates all alarms in case of error state*

* More information on «what is an error», on section 4.7 «Messages and errors»

4.8-ADVANCED CONFIGURATION

Code : 14 13 Function : diSPL

Parameters	Values	Function
nuLL	on	No zeros active to the left
	oFF	Zeros active to the left
LASt	on	Fixes the least significant digit to zero
	oFF	Frees the least significant digit
FiLt	FIL 1	Fast filter on the input signal : 0.25 Sec 98%
	FIL2	Medium filter on the input signal : 0.5 Sec 98%
	FIL3	Slow filter on the input signal: 1 Sec. 98%
Adin	rEAL	Real time indication
	AUErA	Indication of mean values
StEP	88888	Time (between 1 and 255 seconds) to calculate mean values for mean indication

4.9- BLOCKING THE KEYPAD

Code : 14 15 Function : PASSUUord

Parameters	Values	Function
PASSUUord	00000	Blocks the frontal keypad Password is made of a numerical value of 5 digits

4.10-RESETTING THE SYSTEM. DEFAULT VALUES

Code : 14 22 Function : dEFConFr

Resets the unit to the default manufacturing values. It is needed to reconfirm the action by pressing INTRO after the message dEFConFr

General Default Configuration

Acquisition Mode	Real
STEP Value	10
Zero Blanking	ON
Least Significant Digit to zero	OFF
Display Refresh	Filter 2 (0.5 sec.)
Password	deactivated

		Setpoint	Hysteresis	Delay	Type	Led	Text	String
Alarm 1	ON	1000	1	0	HI	DIR	OFF	AL-1
Alarm 2	ON	1000	1	0	HI	DIR	OFF	AL-2
Alarm 3	ON	1000	1	0	HI	DIR	OFF	AL-3
Alarm 4	ON	1000	1	0	HI	DIR	OFF	AL-4

Hysteresis	CENTER
Security Mode	ON
OnError	OFF

Default Configuration TAS-VDC

Input Signal	0/100 VDC
Lo - Low Level Indication	0
HI - High Level Indication	100.00
Decimal Point	0 0 0.0 0

Configuration TAS-IDC

Input Signal	0/5 ADC
Lo - Low Level Indication	0
HI - High Level Indication	5.000
Decimal Point	0 0.0 0 0

Default Configuration TAS-VAC

Input Signal	0/650 VAC
Lo - Low Level Indication	0
HI - High Level Indication	650.0
Decimal Point	0 0 0.0 0

Configuration TAS-IAC

Input Signal	0/5 AAC
Lo - Low Level Indication	0
HI - High Level Indication	5.000
Decimal Point	0 0.0 0 0

4.11-MESSAGES AND ERRORS

Messages and errors are active when the instrument senses a «not normal» situation . The instrument identifies the type of «abnormality» and informs with an error or with a message.

Messages

«Messages» are associated with non-critical situations, those which only affect the measure temporary. The «message» remains active on display until the situation clears. The instrument recovers the normal working state when situation clears.

-oUr	The input signal is lower than selected range
oUr	The input signal is higher than selected range
t INE	Security waiting time exceeded while in configuration mode. The instrument rolls-back to the previous configuration
Error	Error when entering a data. Value not accepted. Reintroduce the value. (Typical case : The value assigned to hysteresis is higher than 255)

Errors

«Errors» are associated with critical situations which disable the ability to measure the signal.

The «error» remains active on display until the situation disappears. At this time, the instrument recovers normal functionality.

«Errors» execute actions on alarms, activating or deactivating them depending on the status of variable OnErr (*see page. 11*). Alarms recover their normal behaviour when the the error state clears.

Err0	Internal Error. Restart the instrument. ** It is possible that no action is performed on alarms if this error is affecting the internal EPROM
nErr0	Mathematical Error 0 Parameters introduced for the input signal are not coherent. (Typical case : the high level value is similar or very close to low level value, on input signal range or indication)
nErr1	Mathematical Error 1: mathematical overflow. The unit is trying to process values higher than 32000 or lower than -32000.
dErr0	Error on Display Indication Trying to display a value higher than 32000 or lower than -19999. Reduce HI and LO levels dividing by 10.

This section blank

Technical data

INDICATION

Display	5 digits, 7 Segments Red Led High Brightness
Digit Height	14,2 mm. / 0,56"
Filter	Anti-reflexive.
Indication	from - 19999 to 32000
Refresh	5 /sec. (Filter selectable)

A/D CONVERTER

Speed	14 Readings / Second
Accuracy	16 BIT + sign (± 65.000 points)
CMRR	> 130 dB

POWER

Standard	230 Vac 50/60 Hz. Consumption 3,5W Max
Optional	115 Vac 50/60Hz. Consumption 3.8W Max
Optional	24 Vdc (±10%) isolated. Consumption 4W Max Isolation 1000 Vdc (Primary - Secondary) Maximum consumption at 24 Vdc .- 265 mA Peak current at start-up <600mA

ENVIRONMENTAL DATA

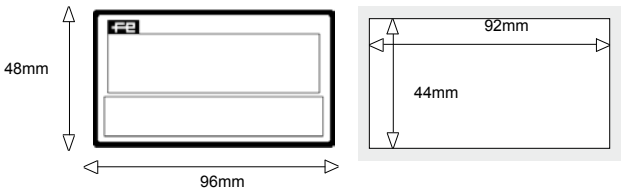
Working Temperature	0 ... + 50 ºC
Storage Temperature	-20 ... + 85 ºC
Humidity	0 ... 85%, non condensated

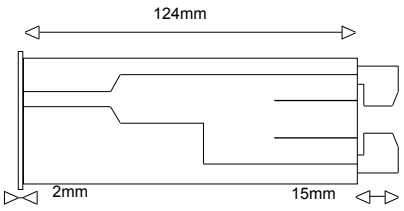
MECHANICAL DATA

Dimensions	Standard 1/8 DIN 96 x 48 x 124 mm. (3,78" x 1.89" x 4,88")
Front	Protection IP65 (NEMA 4)
Weight	0,5 Kgs

OPTIONS

Options EXP, AL2, AL4	see section 7.1
Option TSAT	see section 7.2
Option R485M	see section 7.3
Option TEK	see section 7.4





UNIT TAS-VDC

Input Signal Ranges	0/650 Vdc, 0/100 Vdc, 0/10 Vdc 0/1Vdc, 0/100 mVdc, 0/20 mVdc

Note .- Although not mentioned above, the unit accepts any signal range between 0/20mV and 0/650Vdc, including 60mV, 100mV and 150mV shunt signals. For these ranges. select the closest range and readjust with code 14 11

Accuracy	0,1% from reading ± 1 point
Thermal Drift	± 100 ppm/ºC
Input impedance	1 MOhm for Vin>1Vdc 5 MOhm for Vin<1Vdc
Effective Resolution	32.000 points

UNIT TAS-VAC

Input Signal Ranges	0/650 Vac, 0/100 Vac 0/1 Vac, 0/100 mVac

Note .- Although not mentioned above, the unit accepts any signal range between 0/20mVac and 0/650Vac, including 60mV, 100mV and 150mV shunt signals. For these ranges. select the closest range and readjust with code 14 11

Accuracy	0,3% of reading ± 1 point
Thermal Drift	± 150 ppm/ºC
Input impedance	1 MOhm for Vin>1Vdc 5 MOhm for Vin<1Vdc
Effective Resolution	32.000 points

UNIT TAS-IDC

Input Signal Ranges	0/5 Adc 0/100 mAdc

Note .- Although not mentioned above, the unit accepts any signal range between 0/100mA and 0/5 Adc. For these ranges. select the closest range and readjust with code 14 11

Accuracy	0,1% of reading ± 1 point
Thermal Drift	± 150 ppm/ºC
Input impedance	0.02 Ohm for I>100mA 1 Ohm for I<100mA
Effective Resolution	32.000 points

UNIT TAS-IAC

Input Signal Ranges	0/5 Aac 0/100 mAac

Note .- Although not mentioned above, the unit accepts any signal range between 0/100mAac and 0/5 Aac, including X/5 and X/1 Current Transformer signals. For these ranges. select the closest range and readjust with code 14 11

Accuracy	0,3% of reading ± 1 point
Thermal Drift	± 200 ppm/ºC
Input impedance	0.02 Ohm for I>100mA 1 Ohm for I<100mA
Effective Resolution	32.000 points

7 Options - installation and configuration

The TAS instruments allow several different options to be added to the standard unit. Several requirements between options are needed in order to add an option to a standard TAS unit. Not all options can be added to the same instrument at the same time.

EXP Expansion Bus
AL2 2 Relay Outputs and Expansion Bus
AL4 4 Relay Output (without Expansion Bus)

Note .- Only 1 of these options can be added to the instrument

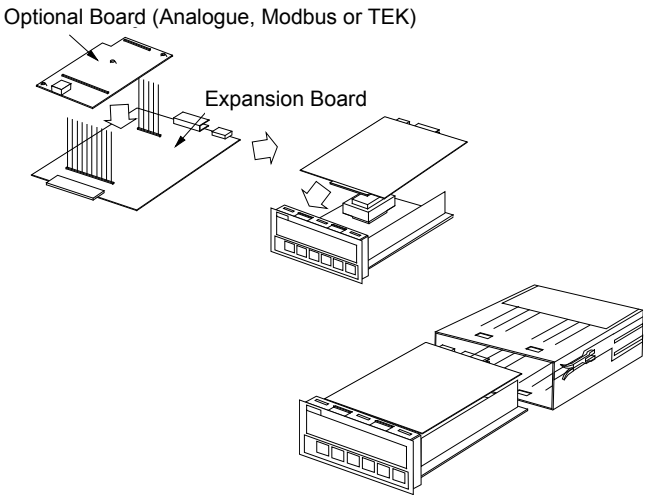
TSAT Analogue output. Requires Expansion Bus option. Not compatible with R485M option

R485M Modbus Output. Requires Expansion Bus option. Not compatible with TSAT option

Note .- Only 1 of TSAT or R485M can be added to a TAS instrument, the unit must have also the Expansion Bus

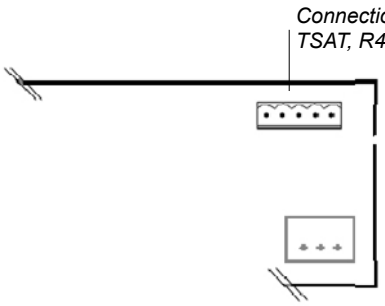
TEK Remote Contacts. Requires Expansion Bus option.

Note .- Can only be added if the TAS instrument has the Expansion bus option. The TEK option can share the bus with 1 TSAT or with 1x R485M or can be installed alone.

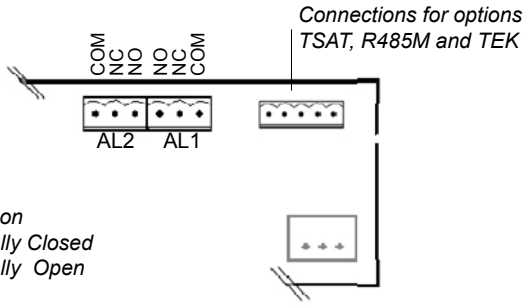


7.1- OPTIONS EXP, AL2 AND AL4

Option **EXP** The EXP allows other options (TSAT, R485M and TEK) to be added to a TAS instrument, without adding relays.

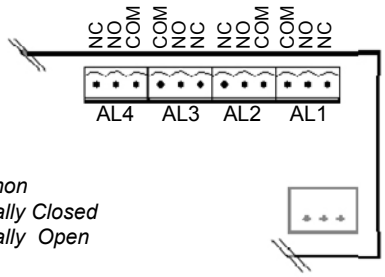


Option **AL2** Option board with 2 Relay output contacts
Relays are controlled by alarms 1 and 2
Includes «Expansion Bus» which allows more options to be installed (TSAT, R485M, TEK)



COM *Common*
NC *Normally Closed*
NO *Normally Open*

Option **AL4**.- Option board with 4 Relay output contacts
Relays are controlled by alarms AL1, AL2, AL3 and AL4
No additional options can be added



COM *Common*
NC *Normally Closed*
NO *Normally Open*

Technical data on relays

Type ON/OFF
Maximum Current 2 A. (non inductive)
Maximum Voltage 250 Vac
Terminals isolated between each other
isolated from power supply
isolated from signal

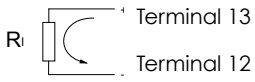
7.2 - ANALOG OUTPUT - TSAT OPTION BOARD

The TSAT board adds analog output capabilities to the TAS instruments. Jumper selectable for voltage (0/10 Vdc) and for current (4/20mA and 0/20mA in modes SINK and SOURCE) adds a galvanic isolation of 2KVeff.

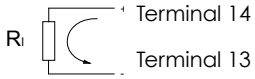
The analog output adjustment is done via the frontal keypad. The analog output value is adjusted related to the display indication. This allows the intelligent use of the correction functions for offsets and fast readjustment of the TAS series, meaning that when readjusting the input/display readings, the analog output does not need to be readjusted most of the times.

in case of trouble with the input signal, such as loop break or sensor break, the analog output signal will exhibit always the same behavior predefined by the operator on the menu.

Voltage Output
Terminal 12 (Negative)
Terminal 13 (Positive)

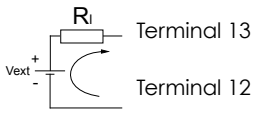


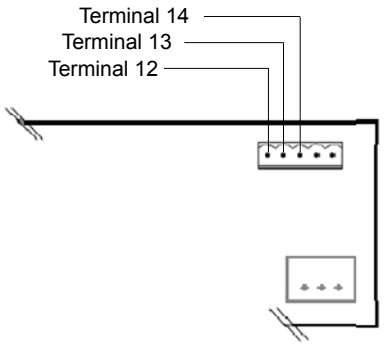
Current Output Source type (Active)
Terminal 13 (Negative)
Terminal 14 (Positive)



Current Output Sink type (Passive)
Terminal 12 (Negative)
Terminal 13 (Positive)

Note .- Sink Current set-up needs external power supply

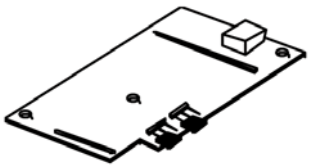




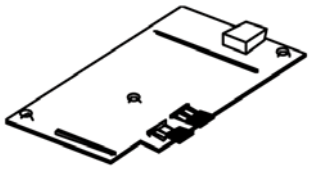
Technical Data

Output Signals	0/10 Vdc, 0/20 mA and 4/20 mA (and others)
Resolution	12 bits
Accuracy	<0.1% FS
Ripple	<0.01% FS
Thermal Drift	100 ppm/ºC
Pass Band	1.5 Hz (-3 dB)
Response Time	250 ms (99% of indication)
Isolation Levels	2KVeff (50 Hz, 1 minute)
mA Output	RLmax 500 Ohms (Source Mode) Imax 21.5 mA approx. SINK Output maximum 40Vdc on terminals
Vdc Output	RL min 1 KOhm Vmax 11 Vdc approx.

Jumpers to the left.- Output in Vdc



Jumpers to the right.- Output in mA



Start-Up procedure

1.- Place jumpers on TSAT board for Vdc or mA output

2.- Plug the TSAT board on the bus pins (Expansion Bus) on board AL2 or EXP

3.- To configure the analog output you need to know the analog output signal and the related display indication

Input Signal	*Indication*	*Analog Output*
4 mA	*0*	*0 Vdc (00000 millivolts)*
20 mA	*100.00*	*10 Vdc (10000 millivolts)*

Note .- Analog output units are entered with 3 decimals, this is, in millivolts and microAmperes.

4.- Make connections, power the unit and configure the board (see next page)

Entering the Menu

Introduce the programming code «55 11»
Message «IC ANG» Analog Output board recognized
Message «MENU» Entering the programming menu
Message «4_20» or «0 10» Shows the operating mode selected by jumpers (Vdc or mA)

Adjusting the Analog Output

**Note .- The values for the following 4 parameter are setable using keys 1,2,3,4,5*

Parameter «d_LO» Display value for the low analog output signal (Display Low)

Parameter «o_LO» Analog output value for the «d_LO» value * (Output Low)

Parameter «d_HI» Display value for the high level analog output (Display High)

Parameter «o_HI» Analog output value for the «d_HI» value* (Output High)

Note .- values for «d_LO» and «d_HI» are in microVolts or microAmperes

Behavior when Error

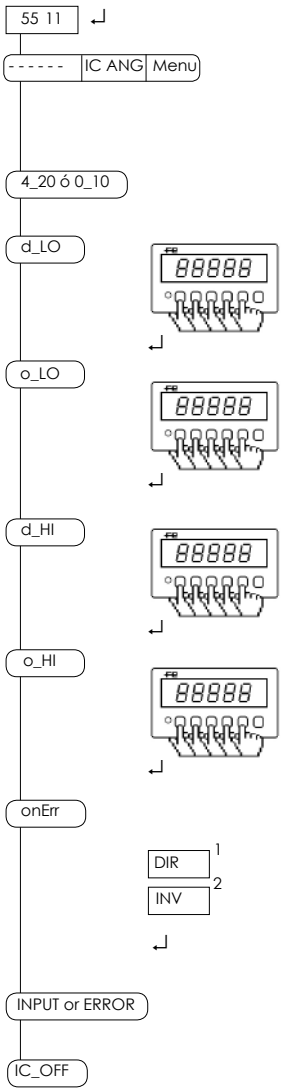
Parameter «OnErr» .- Behavior when an «error» occurs
«DIR» Analog Output up to Full Scale (11Vdc or 21mA approx)
«INV» Analog Output down to zero (-0.5 Vdc or 0mA approx)

Note .- see section 4.11 for a description on «error» conditions

Exiting the Menu

Message «INPUT» Confirms that the parameters have been accepted

Message «ERROR» Informs that at least one of the values is not correct, and the whole configuration could not be applied. Repeat the process from the beginning.



7.3- MODBUS OUTPUT - R485M OPTION BOARD

The R485M board adds Modbus communication capabilities to the TAS- units, for retransmission of visualized data to a remote element. The board is isolated and is completely configurable from frontal keypad.

Protocols	ModBus RTU and ModBus ASCII selectable
Bus	RS485 Half Duplex (EIA-RS485) shielded twisted pair cable, in line, closed with terminator
Speed	2400, 4800, 9600, 19200, 38400 bauds
Addresses	from 0 to 99
Distances	1200 meters per BUS segment 4800 meters with repeaters
Isolation	2 KV with input signal 3.5 KV with power signal
Accepted Functions	[04] H Register Read («Input Register» in the standard)
Register Map	[00 00] H value on display Type Integer Value from -32768 to 32768

[00 01] H Decimal Point position
Type Integer
Value 0, 1, 2, 3, 4
0= No decimal point
1 = 1 Decimal
2. = 2 Decimals
3 = 3 Decimals
4 = 4 Decimals
5 = 5 Decimals

[00 02] H Instrument Status
Type Integer

Word composed fo 5 bits (1+4 bits)
b0=0 register [00 00]H is valid
b0=1 register [00 00]H is not valid

b4,b3,b2,b1
0 = Reserved
1 = Low
2 = -Ovr
3 = +Ovr
4 = DErr0
5 = Brk
6 = Con
7 = Open
8 = MErr0
9 = MErr1
10 to 15 = Reserved

Not Used	b4	b3	b2	b1	b0

[00 03] H Alarms
Type Integer
b0 = 0 / 1 AL1 is OFF / ON
b1 = 0 / 1 AL2 is OFF / ON
b2 = 0 / 1 AL3 is OFF / ON
b3 = 0 / 1 AL4 is OFF / ON

Not Used	b3	b2	b1	b0

Note 1 : If there is no numeric value on display (but a text value), register 0000Hex offers value 32767 or -32768. And bit b0 of register 0002Hex show the display status.

Note 2 : The length of all registers is 2 bytes, defined as LSB and MSB. MSB (Most Significant Byte) is the first to be transmitted. LSB (Least Significant Byte) us the second to be transmitted

Configure MODBUS output

Introduce the programming code «55 11»
Message «IC 485» RS485 board recognized
Message «MENU» Entering the programming menu

Parameter «PROT» Protocol
Select Modbus ASCII or Modbus RTU

Parameter «DIR» Address
Input instrument address

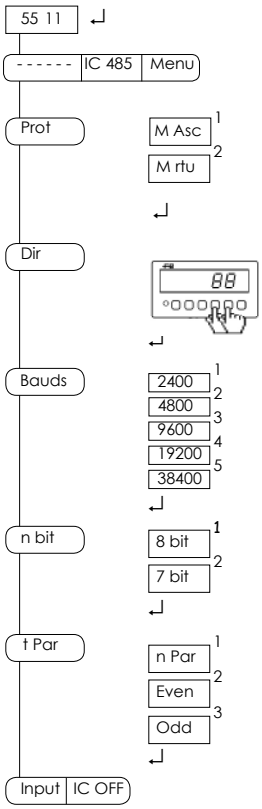
Parameter «BAUDS» Speed in Bauds

Parameter «n BIT» Number of Bits
Select 8 or 7 bits per character

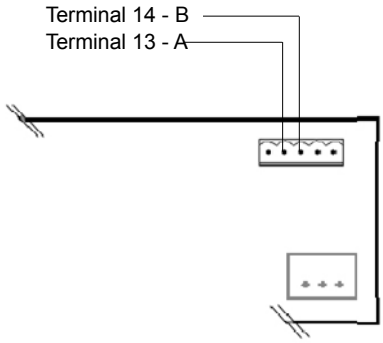
Parameter «t PAR» Parity
«Even» «Odd» «nPar»

Message «INPUT» .- confirms that the parameters have been accepted

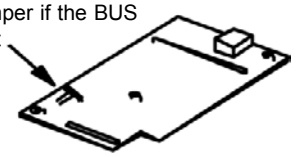
Message «ERROR» .- informs that at least one of the values is not correct, and the whole configuration could not be applied. Repeat the process from the beginning.



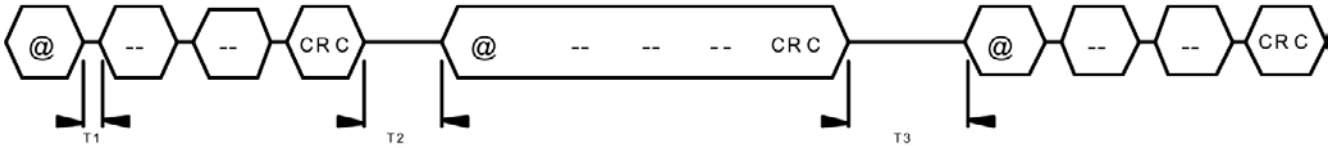
Connections .-
Cables A and B as
Standard Modbus



Terminator .- Place jumper if the BUS ends on this instrument



7.3.1 MODBUS STRUCTURE



Example for a Modbus-RTU frame .- Start Character corresponds with instrument address and final character corresponds with the CRC Security Code
In Modbus-ASCII Start and End characters are specific

T1 = Time between two characters
T2 = Time between end of question and start of response
T3 = Time between end of response and start of next question

	T2 MAX (RTU and ASCII)	T1 (min/max)		T3 (min/max)	
38400	4.3 msec	RTU	0CT / 3CT	RTU	3.5CT / --
19200	5.7 msec	ASCII	0CT / ---	ASCII	--- / ---
9600	9.2 msec				
4800	15.5 msec				
2400	27 msec				

Character Structure

Bit structure for the characters on protocols ModBus RTU and ModBus ASCII

	START	DATA	PARITY	STOP	TOTAL BITS
RTU	1	8	P	1	11
	1	8	I	1	11
	1	8	--	2	11
ASCII	1	7	P	1	10
	1	7	I	1	10
	1	7	--	2	10

Frame Structure

QUESTION : Communication MASTER and SLAVE

ADDRESS	1 CHARACTER	Instrument Address
FUNCTION	1 CHARACTER	Function 04H, register read
READING START REGISTER	2 CHARACTERS	Register 00 00H = Display Value
NUMBER OF REGISTERS TO READ	X CHARACTERS	02 = 2 registers (4 bytes)
CRC	2 CHARACTERS	Control Checksum

RESPONSE : Communication SLAVE to MASTER

ADDRESS	1 CHARACTER	Instrument Address
FUNCTION	1 CHARACTER	Function 04H, register read
LENGTH	1 CHARACTER	Number of data characters following
DATA	X CHARACTERS	Response data*
CRC	2 CHARACTERS	Control Checksum

7.4- PEAK, VALLEY, HOLD, TARE, RESET- OPTION TEK

The TEK option adds functions for PEAK/VALLEY memory, or remote TARE or remote HOLD to the instruments TAS. These functions are selectable and programmable from frontal keypad, and are activated connecting two external contacts to the rear side terminals. Each contact has assigned one function (which can be changed) plus a third function associated to both contacts closing at the same time, to release a RESET for PEAK/VALLEY memory. Isolated option.

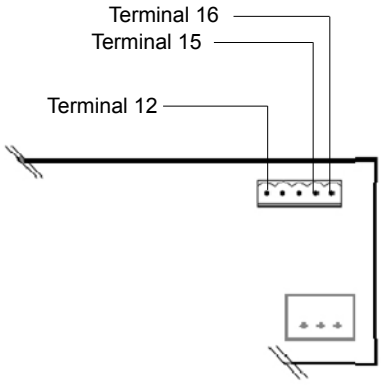
		Contact1	Contact2
Functions	PEAK	YES	YES
	VALLEY	YES	YES
	HOLD	YES	YES
	TARE	YES	NO
	RESET	YES	NO

Note .- the function assigned to Contact1 and Contact2 are configurable from frontal keypad.

Note .- «TEK» board can be configured to release a «RESET» of the «PEAK» and the VALLEY values when both Contact1 and Contact2 are simultaneously closed.

Isolation Levels 2KV to the input signal
3K5V to the power 230Vac and 115Vac
1KV to the power 24Vdc

Terminal 12.- COMMON
Terminal 15 .- CONTACT1
Terminal 16.- CONTACT2



Entering the Menu

Introduce the programming code «14 23»
Message «E INP» TEK board recognized

Configuring the external contacts

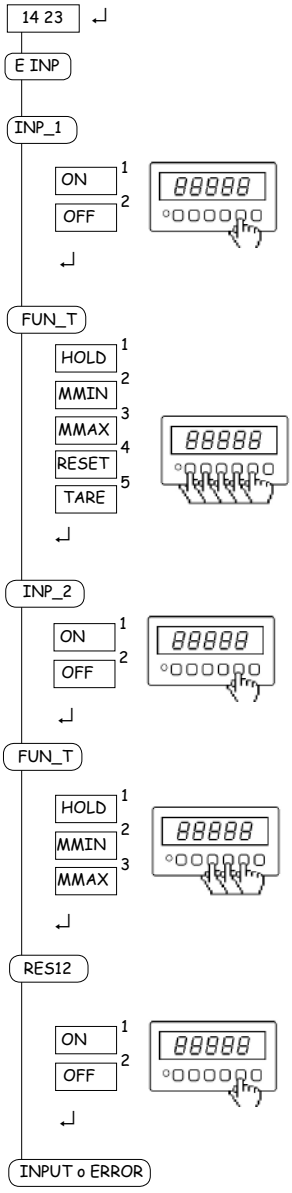
Parameter «INP_1» Contact 1
ON Active
OFF Not Active

Parameter «FUN_T» Function assigned to Contact1

Parameter «INP_2» Contact 2
ON Active
OFF Nor Active

Parameter «FUN_T» Function assigned to Contact2

Parameter «RES12» RESET12
Function «Reset» when connecting contacts 1 and 2 simultaneously
ON Active
OFF Nor Active



Exiting the Menu

Message «INPUT» .- confirms that the parameters have been accepted

Message «ERROR» .- informs that at least one of the values is not correct, and the whole configuration could not be applied. Repeat the process from the beginning.

Default Configuration

When entering code «14 22» to apply a unit reset, the TEK option is configured as follows :

	STATE	FUNCTION
CONTROL 1	OFF	HOLD
CONTROL 2	OFF	HOLD
CONTROL12	OFF	

8 CE declaration of conformity

Manufacturer FEMA ELECTRÓNICA, S.A.
Altimira 14 - Pol. Ind. Santiga
E08210 - Barberà del Vallès
BARCELONA - SPAIN
www.fema.es - info@fema.es

Series TAS, models TP. VAC. VDC. IAC. IDC

The manufacturer declares that the instruments indicated comply with the directives and rules indicated below.

Directive of electromagnetic compatibility 2004/108/CEE
Directive of low voltage 73/23/CEE

Security rules 61010-1
Emission rules 50081-2
Immunity rules 50082-2

Barberà del Vallès October 2009
Daniel Juncà - Quality Manager

9 Warranty

All instruments are warranted against all manufacturing defects for a period of 24 MONTHS from the shipment date. This warranty does not apply in case of misuse, accident or manipulation by non-authorized personnel. In case of malfunction get in contact with your local provider to arrange for repair. Within the warranty period and after examination by the manufacturer, the unit will be repaired or substituted when found to be defective. The scope of this warranty is limited to the repair cost of the instrument, not being the manufacturer eligible for responsibility on additional damages or costs.

10 Precautions on installation

PRECAUTIONS.- Installation and use of this unit must be done by qualified operators. The unit has not AC (mains) switch, neither internal protection fuse, and it will be in operation as soon as power is connected. The installation must contain an external mains switch with protection fuse plus the necessary devices to protect the operator and the process when using the unit to control a machine or process where injury to personnel or damage to equipment or process may occur as a result of failure of the unit.
External Protection Fuse to be added :
for 230 Vac : **80mA fuse TimeLag** as IEC 127/2
for 115 Vac : **125mA fuse TimeLag** as IEC 127/2

SAFETY PRESCRIPTIONS.- These instruments have been designed and tested according to 61010-1 rules and are delivered in good operational conditions. This user manual contains useful information for electrical connections. Do not make wiring signal changes or connections when power is applied to the unit. Make signal connections before power is applied and, if reconnection is required, disconnect the AC (mains) power before such wiring is attempted. Install the unit in a place with good ventilation to avoid excessive heating, and far from electrical noise sources or magnetic field generators such as power relays, electrical motors, speed controls etc...

The unit cannot be installed in open places. Do not use until the installation is finished.

POWER SUPPLY.- The power supply must be connected to the adequate terminals (see connection instructions). Characteristics of the power supply are showed on the characteristics label attached to the instrument. Please make sure the unit is correctly connected to a power supply of the correct voltage and frequency. Do not use other power supply otherwise permanent damage may be caused to the unit. Do not connect the unit to power sources heavily loaded or to circuits which power loads in cycle ON-OFF or to circuits which power inductive loads.

WARNING.- On units with DC power supply, be careful with the polarity indicated for each terminal.

SIGNAL WIRING.- Certain considerations must be given when installing the signal input wires. Long wires can act like an antenna and introduce electrical noise to the unit, therefore :

Do not install the signal input wires in the same conduct with power lines, heaters, solenoids, SCR controls etc...and always far from these elements.

When shielded wires are used, leave unconnected the shield on the indicator side and connect the other end of the shield to the ground terminal of the machine.

SAFETY CONSIDERATIONS

PRESCRIPTIONS.- Before starting any operation of adjustment, replacement, maintenance or repair, the unit must be disconnected from any kind of power supply.
Keep the unit clean , to assure good functioning and performance. To prevent electrical or fire hazard, do not expose the unit to excessive moisture. Do not operate the unit in the presence of flammable gases or fumes, such as environment constitutes a definite safety hazard. The unit is designed to be mounted on a panel.

If the unit shows signs of damage, or is not able to show the expected measures, or has been stored in a bad conditions or a protection failure can occur, then do not attempt to operate and keep the unit out of service.
IN CASE OF FIRE

IN CASE OF FIRE
1.- Disconnect the unit from the power supply.
2.- Give the alarm according to the local rules.
3.- Switch off all the air conditioning devices.
4.- Attack the fire with carbonic snow, do not use water in any case.

WARNING : In closed areas do not use systems with vaporized liquids.

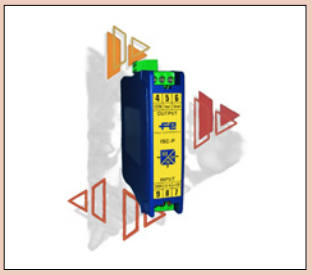
other products

Panel Meters
Standard 96x48mm

Panel Meters
Small 72x36 mm

Panel Meters
Miniature 48x24 mm

Large Displays
60 & 100 mm digit



Signal Converters
& Isolators

Panel Meters
Standard 96x48mm

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ELECTRONIC INSTRUMENTATION FOR INDUSTRY

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